



US010913080B2

(12) **United States Patent**  
**Kim**

(10) **Patent No.:** **US 10,913,080 B2**  
(45) **Date of Patent:** **Feb. 9, 2021**

(54) **PORTABLE SPRAY DEVICE**

(2013.01); *B65D 25/40* (2013.01); *B65D 83/06* (2013.01); *B05B 1/3053* (2013.01)

(71) Applicant: **WINBEES CO., LTD.**, Ansan-si (KR)

(58) **Field of Classification Search**

(72) Inventor: **Soo Hyun Kim**, Yangju-si (KR)

CPC ..... *B05B 3/08*; *B05B 5/0418*; *A23G 3/28*  
USPC ..... *239/302*, *325*; *222/137*, *233*, *236*, *240*;  
*415/72*

(73) Assignee: **WINBEES CO., LTD.**, Ansan-si (KR)

See application file for complete search history.

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 106 days.

(56) **References Cited**

(21) Appl. No.: **16/222,604**

U.S. PATENT DOCUMENTS

(22) Filed: **Dec. 17, 2018**

5,062,573 A \* 11/1991 Makimura ..... F02M 51/0675  
*239/533.12*  
5,071,040 A \* 12/1991 Laptewicz, Jr. .. B01F 15/00681  
*222/235*

(65) **Prior Publication Data**

(Continued)

US 2019/0118193 A1 Apr. 25, 2019

FOREIGN PATENT DOCUMENTS

**Related U.S. Application Data**

(63) Continuation of application No. PCT/KR2016/012177, filed on Oct. 27, 2016.

JP S63-100976 A 5/1988  
JP 3002262 U 9/1994

(Continued)

(30) **Foreign Application Priority Data**

OTHER PUBLICATIONS

Jun. 17, 2016 (KR) ..... 10-2016-0076041

International Search Report issued in PCT/KR2016/012177; dated Mar. 24, 2017.

(Continued)

(51) **Int. Cl.**

*B05B 5/00* (2006.01)  
*B05B 5/04* (2006.01)  
*B65D 25/40* (2006.01)  
*B65D 83/06* (2006.01)  
*A23G 3/28* (2006.01)  
*B05B 3/08* (2006.01)  
*B05B 7/14* (2006.01)  
*B05B 1/00* (2006.01)  
*B44C 1/00* (2006.01)  
*B05B 1/30* (2006.01)

Primary Examiner — Viet Le

(74) Attorney, Agent, or Firm — Studebaker & Brackett PC

(52) **U.S. Cl.**

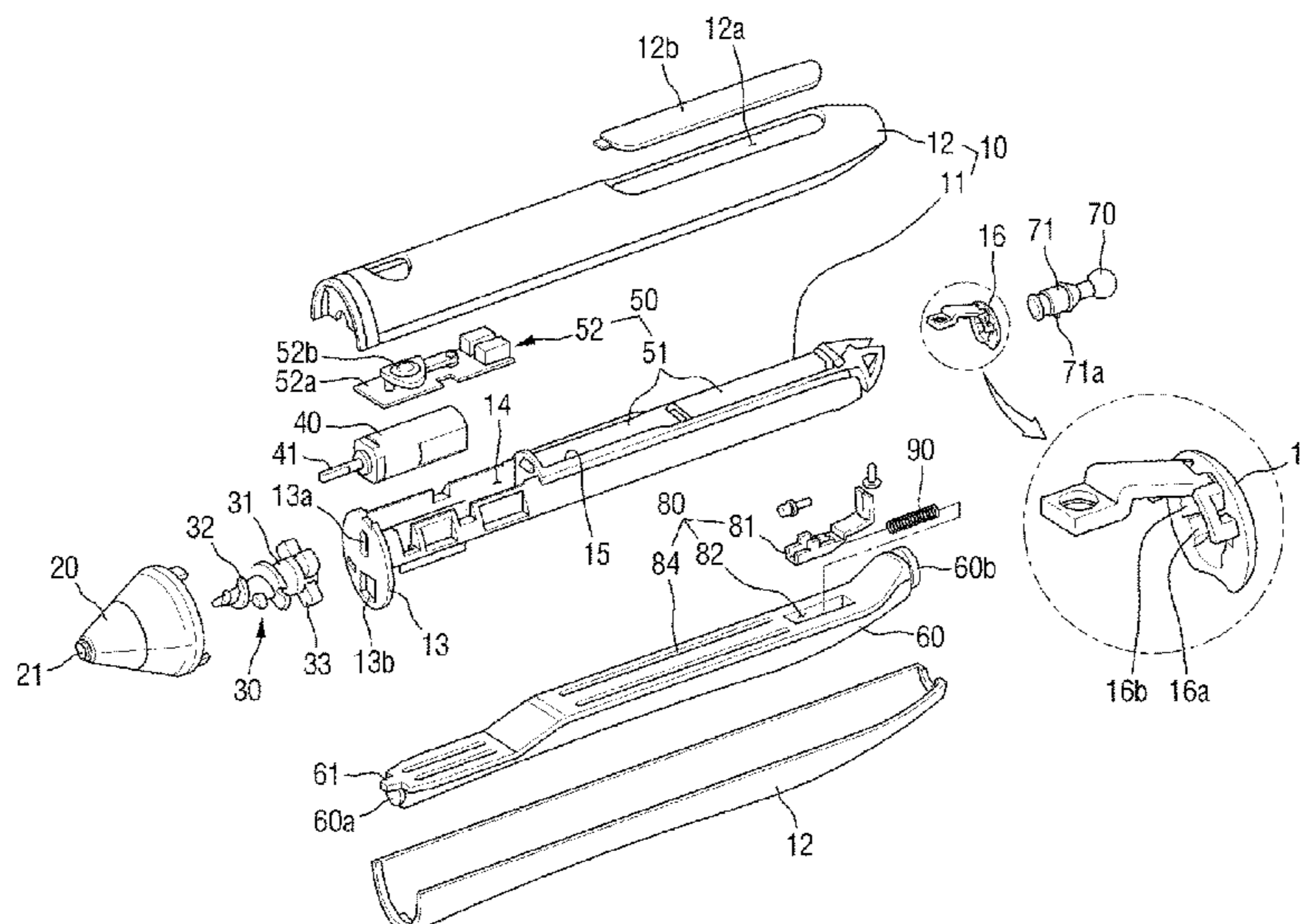
CPC ..... *B05B 5/0418* (2013.01); *A23G 3/28* (2013.01); *B05B 1/00* (2013.01); *B05B 3/08* (2013.01); *B05B 7/1422* (2013.01); *B44C 1/00*

(57)

**ABSTRACT**

The present invention relates to a portable spray device and, more specifically, to a portable spray device moving a cartridge member by means of a simple rotational motion of a spray rotating body, thereby enabling powder positioned inside the cartridge member to be effectively sprayed to the outside.

**18 Claims, 6 Drawing Sheets**



(56)

References Cited

2019/0118193 A1\* 4/2019 Kim ..... B05B 5/0418

U.S. PATENT DOCUMENTS

5,242,234 A \* 9/1993 Ahrens ..... B05B 11/0035  
 401/134  
 6,699,214 B2 \* 3/2004 Gellman ..... A61M 5/2066  
 604/187  
 6,851,923 B1 \* 2/2005 Fugere ..... B05C 11/10  
 222/413  
 7,014,640 B2 \* 3/2006 Kemppainen ..... A61B 17/8822  
 606/86 R  
 7,178,745 B1 \* 2/2007 Fugere ..... B05C 5/0225  
 239/302  
 7,922,044 B2 \* 4/2011 Luchinger ..... G01F 13/001  
 222/344  
 8,308,681 B2 \* 11/2012 Slocum ..... A61B 17/00491  
 604/82  
 9,067,011 B2 \* 6/2015 Zou ..... A61M 5/14276  
 2004/0050873 A1 \* 3/2004 Vohwinkel ..... G01G 13/026  
 222/233  
 2006/0283975 A1 \* 12/2006 Muir ..... A23G 1/042  
 239/146  
 2007/0213659 A1 \* 9/2007 Trovato ..... A61M 5/1723  
 604/67

FOREIGN PATENT DOCUMENTS

JP 2002-096882 A 4/2002  
 JP 2003-129670 A 5/2003  
 JP 2006-289259 A 10/2006  
 JP 3942708 B2 7/2007  
 JP 2009-297623 A 12/2009  
 JP 3192987 U 9/2014  
 KR 1998-032371 U 9/1998  
 KR 20-0219549 Y1 4/2001  
 KR 10-2010-0124515 A 11/2010  
 KR 10-2011-0070203 A 6/2011  
 KR 10-2013-0108728 A 10/2013  
 KR 10-2015-0068558 A 6/2015

OTHER PUBLICATIONS

An Office Action mailed by the Japanese Patent Office dated Nov. 5, 2019, which corresponds to Japanese Patent Application No. 2019-518912 and is related to U.S. Appl. No. 16/222,604.

\* cited by examiner



FIG. 2

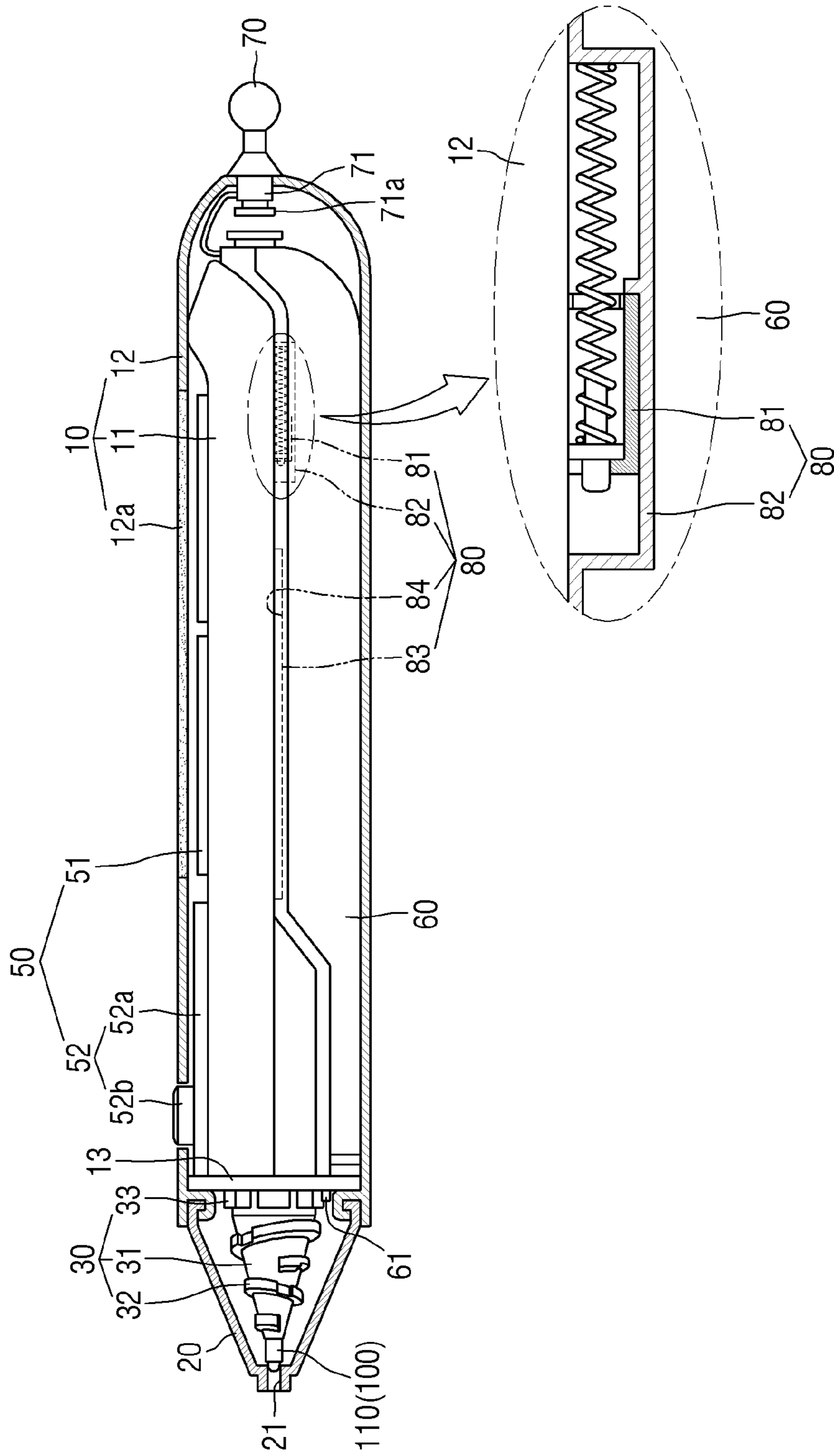


FIG. 3

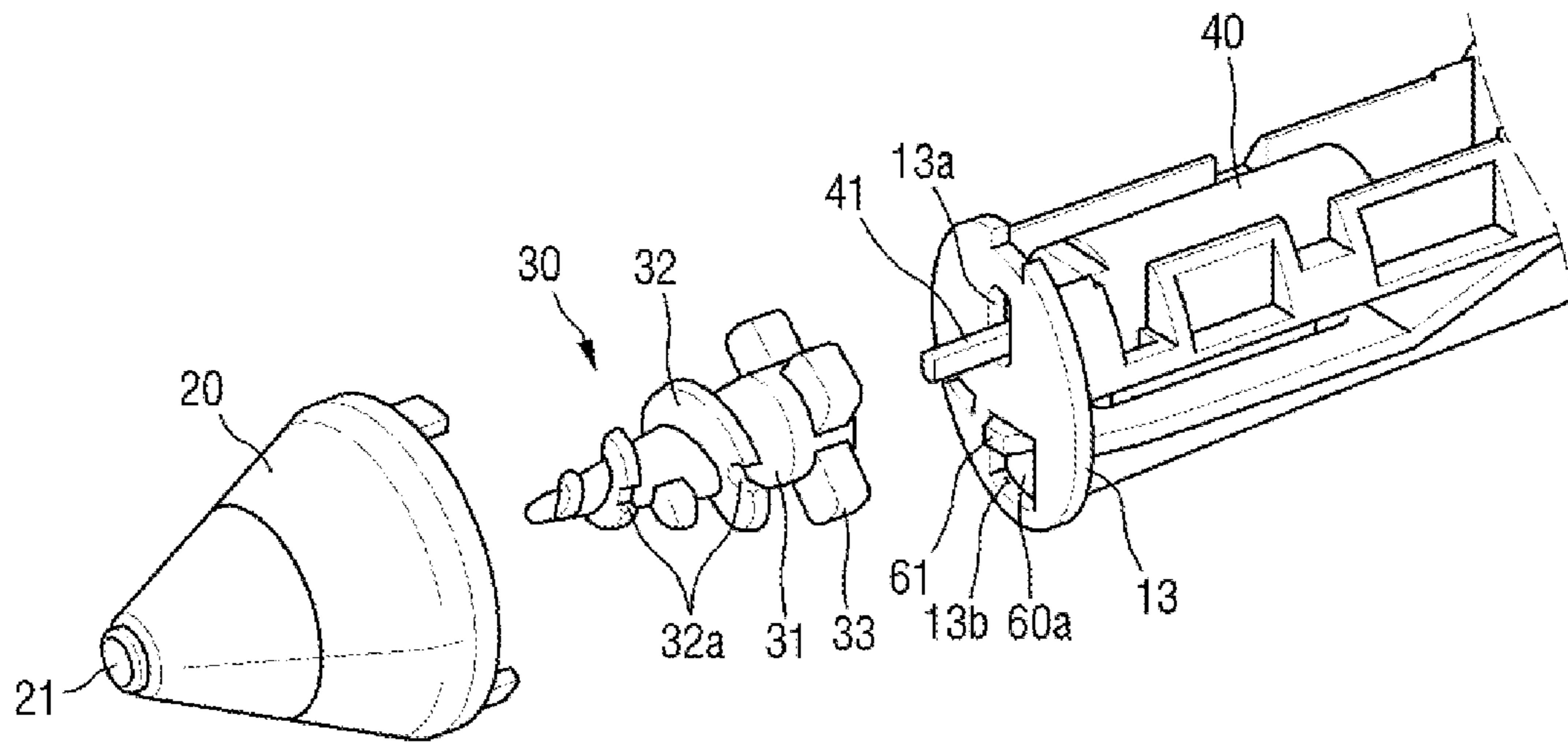


FIG. 4

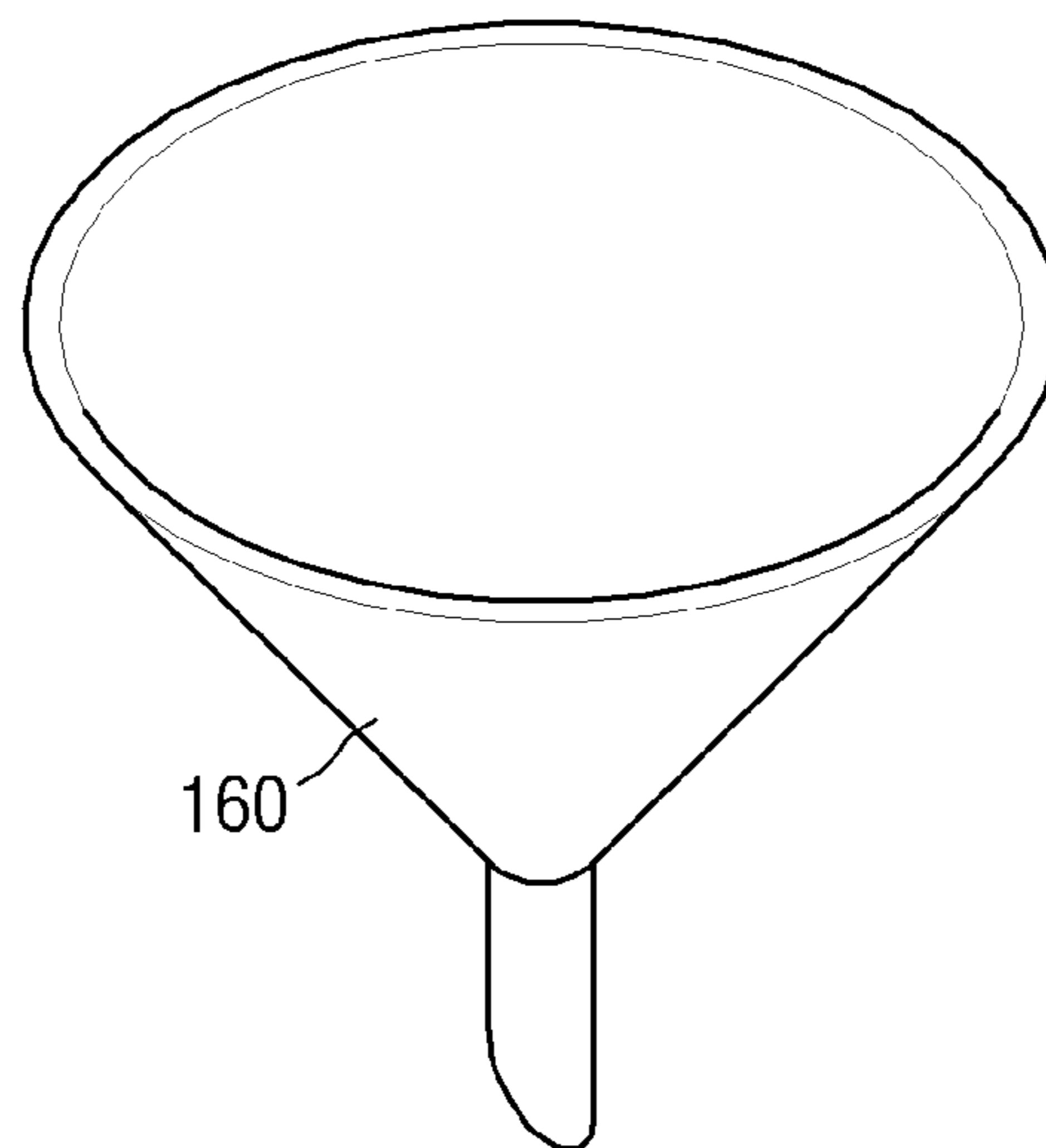


FIG. 5

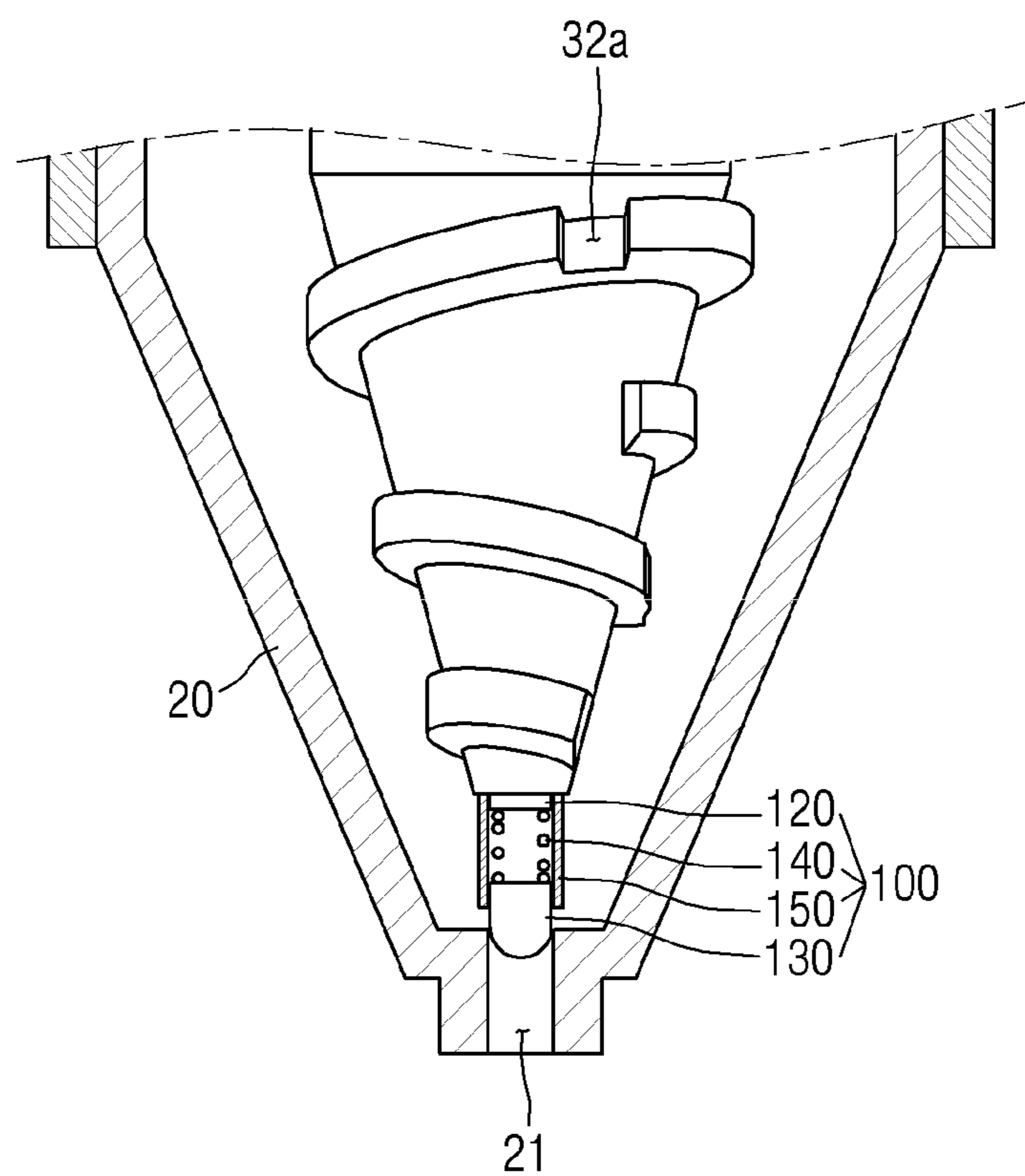


FIG. 6

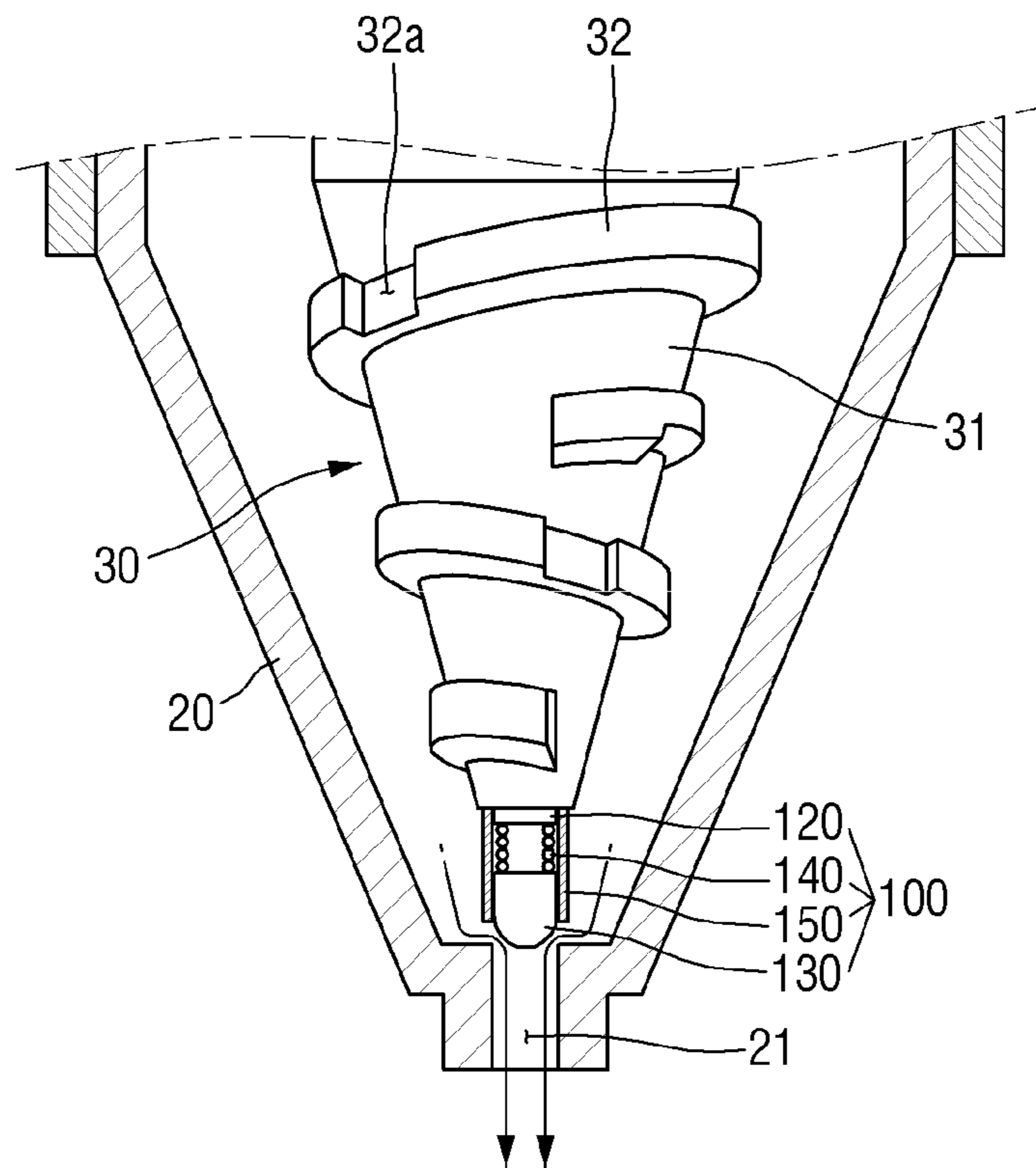
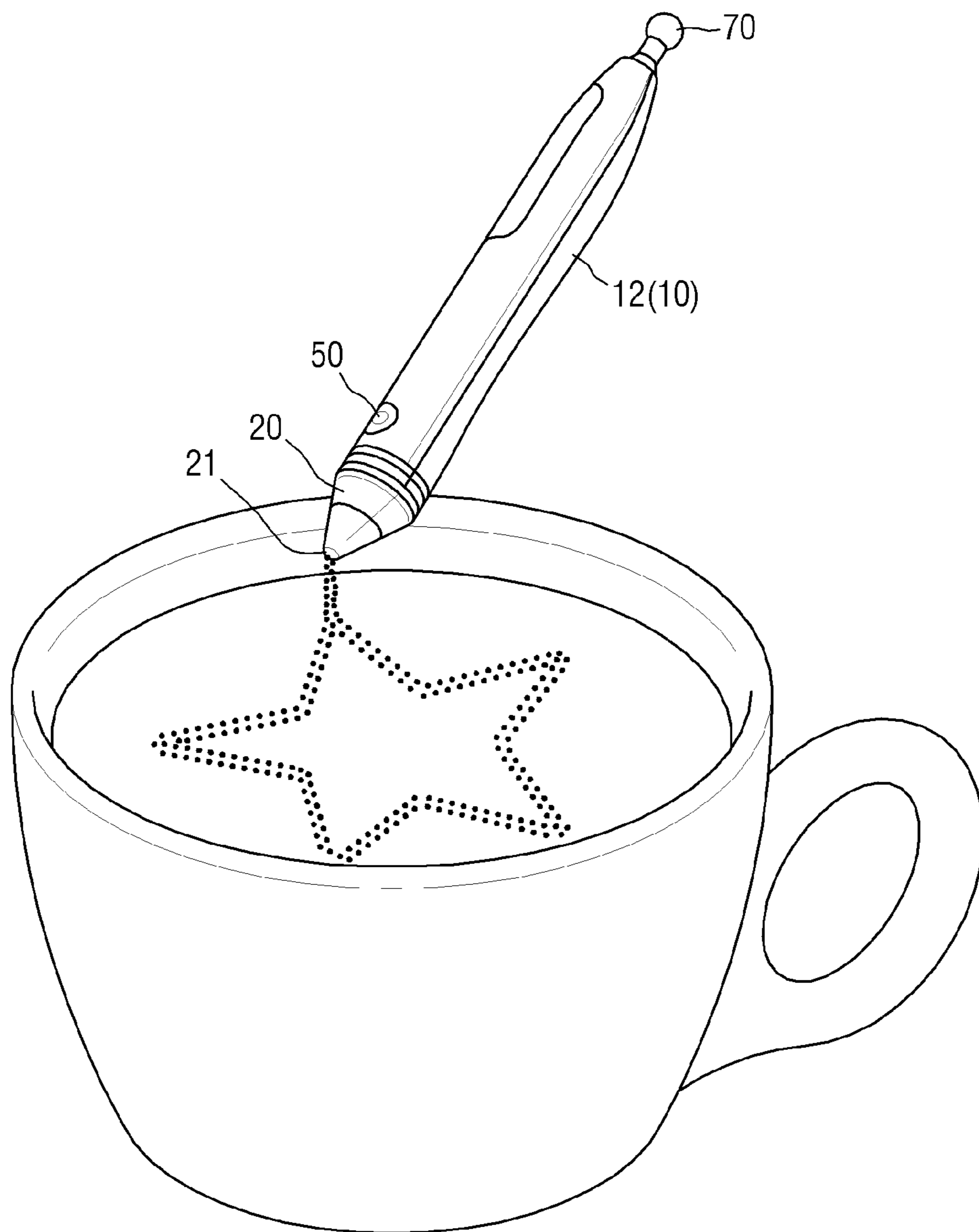


FIG. 7





## 1

## PORTABLE SPRAY DEVICE

This application is a continuation application of PCT International Application No. PCT/KR2016/012177 filed Oct. 27, 2016, which claims priority from Korean Patent Application No. 10-2016-0076041, filed on Jun. 17, 2016 in the Korean Intellectual Property Office, the disclosures of which are incorporated herein in their entirety by reference.

## TECHNICAL FIELD

The present invention relates to a portable spray device, and more particularly, a portable spray device capable of effectively spraying powder placed in a cartridge member to the outside by moving the cartridge member through simple rotational movement of a spraying rotor.

## BACKGROUND ART

Recently, an interest in food is increasing and additionally an interest in a skill and a method of decorating food is also increasing. As an example of decorating food, how to draw letters or patterns on a cake and the like is commonly known. As a method of drawing letters, patterns, or the like on a cake or the like, a method of holding and gripping a tube, in which liquid cream, liquid chocolate, or the like having high viscosity is inserted, to squeeze a liquid material therein toward an end of the tube is generally used.

Although liquid chocolate, dressing, and the like with high viscosity are used as a material for decorating food, recently decorating food has been gradually increased to include decorating food using a powder material.

Particularly, a decoration method of forming letters, patterns, or the like using a powder material such as cinnamon powder or the like on the basis of skills of milk steaming, latte art, chocolate art, variation coffee, and the like is generally used.

However, since it is impossible to use a powder material with a conventional tube type decoration tool and a spray amount is determined by a pressure of gripping a tube by a user, in the case of an unskilled user, it is difficult to form letters or patterns by adjusting a spray amount.

Also, Korean Patent Publication No. 2015-0068558 discloses a tool for decorating a beverage in which a paper or plastic sheet carved with a pattern or a letter is fixed to a cup or glass and then powder of a green tea mixture or the like is sprinkled on the paper or plastic so as to form the letter or image on a surface of the beverage.

However, the tool for decorating a beverage disclosed in Korean Patent Publication No. 2015-0068588 has a problem in which only a determined letter or a pattern formed in a paper or plastic sheet is usable instead of creatively forming a letter or a pattern desired by a user.

Also, since it is necessary to sprinkle powder over a paper or plastic sheet to cover a letter or an image thereof entirely, an amount of wasted powder on another part of the paper or plastic sheet is large and it is difficult to precisely form a pattern or a letter formed on a surface of a beverage with a uniform thickness.

## Technical Problem

The present invention is directed to providing a portable spray device capable of uniformly spraying powder type materials in addition to liquid materials.

The present invention is also directed to providing a portable spray device capable of effectively ejecting powder

## 2

placed in a cartridge member to the outside by moving the cartridge member through simple rotational movement of a spraying rotor.

The present invention is also directed to providing a portable spray device capable of freely forming a letter, a pattern, or the like desired by a user on a surface of a beverage such as coffee and the like in addition to food to decorate by easily and uniformly spraying a powder type material.

## Technical Solution

One aspect of the present invention provides a portable spray device including a body casing member, a spray nozzle member which is provided at a front end part of the body casing member and includes a spray hole for spraying a powder material, a cartridge member which is located in the body casing member and discharges a stored powder material through an outlet and supplies the stored powder material to an inside of the spray nozzle member, and a spraying rotor which is disposed in the spray nozzle member and sprays the powder material through the spray hole through rotation thereof.

The spraying rotor may collide with the cartridge member at least once during a single rotation and may move the cartridge member.

The movement of the cartridge member may include at least one of upward and downward movement, leftward and rightward movement, regular or irregular movement, and diagonal movement.

The outlet may be disposed at a front end part of the cartridge member, and the cartridge member may be moved in a longitudinal direction.

The spraying rotor may include a rotational shaft portion which receives a rotating force and rotates and a spiral protrusion portion which spirally protrudes from an outer circumferential surface of the rotational shaft portion.

The spraying rotor may further include a cartridge-colliding protrusion portion which protrudes from the rotational shaft portion and collides with the cartridge member.

A cartridge protrusion portion, which collides with the cartridge-colliding protrusion portion, may protrude from a front end part of the cartridge member.

The rotational shaft portion may have a conical shape having a diameter gradually decreasing toward a front end part. Also, the spiral protrusion portion may include a plurality of material-moving groove portions spaced apart from each other.

The spiral protrusion portion may have a shape in which a plurality of spiral protrusions are spaced apart from each other and an interval is formed therebetween.

The portable spray device may further include a linear movement guide member which guides the movement of the cartridge member.

The portable spray device may further include a cartridge-supporting spring member which elastically supports the cartridge member.

The body casing member may include a rotating motor rotating the spraying rotor, an inner casing portion in which an operation control portion controlling an operation of the rotating motor is mounted, and an outer casing portion in which the inner casing portion is disposed. Also, the linear movement guide member may include a main linear moving body provided at any one of a first surface of the inner casing portion facing the cartridge member and a second surface of the cartridge member facing the inner casing portion and include a main linear movement guide rail provided at the

3

other of the first surface and the second surface and with which the main linear moving body is combined to be linearly movable.

The portable spray device may further include a cartridge-supporting spring member which elastically supports the cartridge member. The cartridge-supporting spring member may be provided in the main linear movement guide rail and may elastically support the cartridge member.

The linear movement guide member may further include a movement guide protrusion portion which protrudes from any one of the first surface and the second surface, and a movement guide slit groove portion which is provided at any one of the first surface and the second surface, into which the movement guide protrusion portion is inserted, and which is disposed in a longitudinal direction of the body casing member.

The body casing member may include a rotating motor rotating the spraying rotor, an inner casing portion in which an operation control portion controlling an operation of the rotating motor is mounted, and an outer casing portion in which the inner casing portion is disposed. Also, any one of the inner casing portion and the outer casing portion may slide toward the other and be combined therewith.

The portable spray device may further include a funnel member which fills the inside of the cartridge member with a powder material.

The portable spray device may further include a spray hole opening or closing member which opens or closes the spray hole.

The spray hole opening or closing member may include an electromagnet portion provided at a front end part of the spraying rotor, a spray hole stopper portion which is moved by a magnetic force of the electromagnet portion and opens or closes the spray hole, a stopper-supporting spring member which elastically supports the spray hole stopper portion to block the spray hole, and a stopper movement guide portion which guides movement of the spray hole stopper portion.

The electromagnet portion may receive electrical power when the rotating motor is operated and generate a magnetic force to open the spray hole, and electrical power supply may be blocked when the rotating motor is stopped.

#### Advantageous Effects

According to the present invention, since it is possible to uniformly spray a powder material without a clog through rotation of a screw included in a nozzle, effects of using the material without a problem caused by clogging of the material and significantly increasing convenience in use are present.

According to the present invention, since it is possible to freely express and easily decorate letters, patterns, or the like, which are desired by a user, not only on food but also a drink such as coffee and the like by smoothly and uniformly spraying a powder material without a cog, effects of maximizing expressiveness of the user and increasing expressiveness and aesthetic effects of decorating letters or patterns are present.

#### DESCRIPTION OF DRAWINGS

FIG. 1 is an exploded perspective view illustrating one embodiment of a portable spray device according to the present invention.

FIG. 2 is a cross-sectional view illustrating one embodiment of the portable spray device according to the present invention.

4

FIG. 3 is an enlarged perspective view of a significant part of the portable spray device according to the present invention.

FIG. 4 is a perspective view illustrating a funnel member of the portable spray device according to the present invention.

FIGS. 5 and 6 are enlarged cross-sectional views illustrating an inside of a spray nozzle member in the portable spray device according to the present invention.

FIG. 7 is a use state view of the portable spray device according to the present invention.

#### MODES OF THE INVENTION

Hereinafter, preferred embodiments of the present disclosure will be described with reference to the attached drawings. Advantages and features of the present disclosure and methods of accomplishing the same may be understood more readily by reference to the following detailed description of preferred embodiments and the accompanying drawings. The present disclosure may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete and will fully convey the concept of the disclosure to those skilled in the art, and the present disclosure will only be defined by the appended claims. Like numbers refer to like elements throughout.

Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. Further, it will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein. The terms used herein are for the purpose of describing particular embodiments only and is not intended to be limiting. As used herein, the singular forms are intended to include the plural forms as well, unless the context clearly indicates otherwise.

It will be understood that the terms “comprise” and/or “comprising” when used herein, specify some stated components, steps, operations and/or elements, but do not preclude the presence or addition of one or more other components, steps, operations and/or elements.

FIG. 1 is an exploded perspective view illustrating one embodiment of a portable spray device according to the present invention, FIG. 2 is a cross-sectional view illustrating one embodiment of the portable spray device according to the present invention, and FIG. 3 is an enlarged perspective view illustrating a spraying rotor 30 of the portable spray device according to the present invention.

Referring to FIGS. 1 to 3, one embodiment of the portable spray device according to the present invention will be described below in detail. The portable spray device according to the present invention includes a body casing member 10 securing an installation space therein.

The body casing member 10 includes an inner casing portion 11 in which a rotating motor 40 and an operation control portion 50 are mounted and which guides movement of a cartridge member 60 and an outer casing portion 12 in which the inner casing portion 11 is disposed.

It should be noted that the outer casing portion 12 has, for example, a cylindrical shape and may be modified into any shape capable of securing a space for allowing the inner

casing portion **11** to be disposed therein and being easily gripped by a hand of a user to be used.

The inner casing portion **11** is shown as being manufactured separately from the outer casing portion **12** and assembled in the outer casing portion **12** but may be formed integrally with the outer casing portion **12** to protrude from an inner circumferential surface of the outer casing portion **12**.

The outer casing portion **12** is separated into two bodies, and the inner casing portion **11** is assembled with an inside of the outer casing portion **12** formed by combining the two bodies as an example.

Although not shown in the drawings, any one of the inner casing portion **11** and the outer casing portion **12** may be slid toward the other and combined with the other.

That is, any one of the inner casing portion **11** and the outer casing portion **12** includes a rail for slide coupling, and the other thereof includes a sliding body combined with the rail for slide coupling such that the inner casing portion **11** and the outer casing portion **12** may be assembled with each other in a sliding manner.

A spray nozzle member **20** including a spray hole **21** for spraying a powder material is combined with a front end part of the body casing member **10**, that is, a front end part of the outer casing portion **12**.

The spray nozzle member **20** has a conical shape with a diameter which becomes gradually smaller toward a front end part thereof and includes the spray hole **21** provided at the front end part as an example.

The spraying rotor **30** which sprays the powder material through the spray hole **21** is rotatably disposed in the spray nozzle member **20**.

The spraying rotor **30** is combined with a motor shaft **41** of the rotating motor **40** mounted in the body casing member **10** and rotates with the motor shaft **41**.

The operation control portion **50** which controls an operation of the rotating motor **40** may be mounted in the body casing member **10**.

The operation control portion **50** includes a power supply portion **51** which supplies electric power to the rotating motor **40** and a switch portion **52** which is electrically connected to the power supply portion **51** and the rotating motor **40** and supplies electrical power from the power supply portion **51** to the rotating motor **40** or blocks the electrical power.

The switch portion **52** may include a substrate **52a** including a circuit capable of controlling the operation of the rotating motor **40** and a switch **52b** which is provided on the substrate **52a** and applies a signal for operating or stopping the rotating motor **40**.

The power supply portion **51** is, for example, a battery or a rechargeable battery, of which the battery replaceable is used in the present invention, and may include a wire and a plug, which is not shown, capable of being combined with an electrical outlet for power supply.

A front portion **13** of the body casing member **10** may include a shaft through hole **13a** and a discharge through hole **13b** through which a cartridge protrusion portion **61** protruding from a front end part of the cartridge member **60** passes and which communicates with an outlet **60a** of the cartridge member **60**.

That is, the inner casing portion **11** includes the front portion **13**, a motor mounting space portion **14** which is provided in the rear of the front portion **13**, in which the rotating motor **40** is inserted and mounted, and which communicates with the shaft through hole **13a**, and a battery insertion portion **15** which is provided in the rear of the

motor mounting space portion **14** and supplies electrical power to the rotating motor **40**.

The outer casing portion **12** may include a battery replacement open portion **12a** which exposes the battery insertion portion **15** and a battery cover portion **12b** which covers and is detachably coupled with the battery replacement open portion **12a**.

When the battery cover portion **12b** is separated from the outer casing portion **12**, a battery inserted in the battery insertion portion is exposed through the battery replacement open portion **12a** such that the battery may be easily replaced.

The cartridge member **60** is mounted in the body casing member **10**. A powder material is stored in the cartridge member **60**. An outlet **60a** which supplies the powder material to the spraying rotor **30** is provided at the front end part of the cartridge member **60**.

The spraying rotor **30** collides with the cartridge member **60** at least once during a single rotation so as to repeatedly move the cartridge member **60** in the body casing member **10** such that the powder material in the cartridge member **60** is more easily moved toward the outlet **60a** and is more easily discharged through the outlet **60a**.

As an example, movement of the cartridge member **60** includes at least one of upward and downward movement, leftward and rightward movement, regular or irregular movement, and diagonal movement.

As an example, the cartridge member **60** is disposed in a longitudinal direction of the outer casing portion **12** such that a part of an outer surface thereof comes into close contact with a part of an outer surface of the inner casing portion **11**.

The cartridge protrusion portion **61**, which collides with the spraying rotor **30** during rotation of the spraying rotor **30**, may be provided to protrude from the front end part of the cartridge member **60**, and a material supply hole **60b**, through which the powder material may be supplied to an inside thereof, may be provided at a rear end of the cartridge member **60**.

A supply hole exposure hole **16a**, which exposes the material supply hole **60b**, is provided at a rear end part of the body casing member **10**, and a stopper member **70** is detachably coupled with the supply hole exposure hole **16a**.

As an example, a stopper-combining flange portion **16** including the supply hole exposure hole **16a** is provided at a rear end of the inner casing portion **11** and is disposed to be exposed at a rear of the outer casing portion **12**.

A stopper-combining portion **71** passing through the supply hole exposure hole **16a** protrudes from an end part of the stopper member **70**, and a plurality of combination protrusions **71a** are provided on an outer circumferential surface of the stopper-combining portion **71**.

Also, a combination groove portion **16b**, through which the combination protrusion **71a** passes, is provided on an inner circumferential surface of the supply hole exposure hole **16a**.

The stopper member **70** passes and then rotates the combination protrusion **71a** of the stopper-combining portion **71** through the combination groove portion **16b** such that the combination protrusion **71a** is held by the inner circumferential surface of the supply hole exposure hole **16a** for the stopper member **70** to be combined with the stopper-combining flange portion **16** and block the material supply hole **60b**.

Also, while the stopper member **70** is turned such that the combination protrusion **71a** coincides with the combination groove portion **16b**, the stopper member **70** is pulled and

easily separated from the stopper-combining flange portion **16** so as to open the supply hole exposure hole **16a** such that the cartridge member **60** may be refilled with the powder material by supplying the powder material thereto through the material supply hole **60b**.

Meanwhile, the spraying rotor **30** includes a rotational shaft portion **31**, which receives a rotation force of the rotating motor **40** and rotates and includes a spiral protrusion portion **32**, which spirally protrudes from an outer circumferential surface of the rotational shaft portion **31** and may further include a cartridge-colliding protrusion portion **33** which protrudes from the rotational shaft portion **31** and collides with the cartridge member **60**.

As an example, the rotational shaft portion **31** has a conical shape having a diameter decreasing toward a front end part thereof.

Also, the spiral protrusion portion **32** may include a plurality of material-movement groove portions **32a** spaced apart from each other.

Also, the spiral protrusion portion **32** may have a shape in which a plurality of spiral protrusions are spaced apart from each other and an interval is formed therebetween.

The material-movement groove portion **32a** allows the powder material to easily move toward the spray hole **21** in the spray nozzle member **20** through rotation of the spraying rotor **30**.

Also, the spiral protrusion portion **32** includes the plurality of spiral protrusions and the interval between the spiral protrusions such that the powder material may be easily moved toward the spray hole **21** in the spray nozzle member **20** through the rotation of the spraying rotor **30**.

As an example, the cartridge-colliding protrusion portion **33** protrudes from a rear end part of the rotational shaft portion **31** and collides with the front end part of the cartridge member **60**. A plurality of such cartridge-colliding protrusion portions **33** protrude to be spaced apart from each other along an outer perimeter of the rotational shaft portion **31** and collide with the cartridge member **60** a plurality of times during a single rotation of the rotational shaft portion **31** to generate vibration in the cartridge member **60**.

The cartridge-colliding protrusion portion **33** collides with the cartridge protrusion portion **61** protruding from the front end part of the cartridge member **60**, and the cartridge protrusion portion **61** is disposed at a position to protrude toward the front surface of the front portion **13** through the discharge through hole **13b** of the front portion **13** and to collide with the cartridge-colliding protrusion portion **33**.

As an example, the cartridge member **60** is movably disposed in a longitudinal direction of the body casing member **10** and is pushed and moved in the longitudinal direction when colliding with the cartridge-colliding protrusion portion **33**.

The portable spray device according to the present invention may further include a linear movement guide member **80** which guides linear movement of the cartridge member **60**.

Also, the portable spray device according to the present invention may further include a cartridge-supporting spring member **90** which elastically supports the cartridge member **60**.

The cartridge-supporting spring member **90** elastically supports the cartridge member **60** such that the front end part of the cartridge member **60** collides with the spraying rotor **30** and, more particularly, allows the cartridge protrusion portion **61** to return to a position at which the cartridge

protrusion portion **61** protrudes through the discharge through hole **13b** and collides with the cartridge-colliding protrusion portion **33**.

Since the outlet **60a** is disposed to face the front end part of the cartridge member **60** and the cartridge member **60** is disposed in the longitudinal direction of the body casing member **10**, when the cartridge member **60** precisely performs linear movement in the longitudinal direction of the body casing member **10**, the powder material therein may be most efficiently and easily discharged through the outlet **60a**.

When the cartridge member **60** collides with the spraying rotor **30** and movement occurs in a leftward or rightward direction, a force of moving the powder material to the outlet **60a** of the front end part in the cartridge member **60** is dispersed such that the powder material does not easily move toward the outlet **60a**.

Also, when the cartridge member **60** moves leftward or rightward, the outlet **60a** of the cartridge member **60** deviates from the discharge through hole **13b** such that the powder material may be held by the front portion **13** and remain in the outer casing portion **12**.

When the material storing cartridge collides with the spraying rotor **30**, the linear movement guide member **80** guides linear reciprocal movement of the cartridge member **60** and linearly concentrates a force of moving the powder material from an inside of the cartridge member **60** to the outlet **60a** at the front end part of the cartridge member **60** so as to easily discharge the powder material through the outlet **60a**.

Also, the linear movement guide member **80** guides the linear reciprocal movement of the cartridge member **60** such that the powder material may not scatter when being discharged through the outlet **60a** and the entire quantity of discharged powder material may be supplied to the inside of the spray nozzle member **20** through the discharge through hole **13b**.

The cartridge-colliding protrusion portion **33** and the cartridge protrusion portion **61** have curved colliding parts which collide with each other such that the cartridge member **60** is easily pushed and moved by a collision between the cartridge-colliding protrusion portion **33** and the cartridge protrusion portion **61** in a longitudinal direction, that is, toward a rear end part, and the cartridge-colliding protrusion portion **33** is held by the cartridge protrusion portion **61** and the spraying rotor **30** is easily rotated without stopping.

As an example, at least a part of an outer surface of the cartridge member **60** comes into contact with a part of an outer surface of the inner casing portion **11** such that movement of the part is guided in a longitudinal direction.

The linear movement guide member **80** includes a main linear moving body **81** provided at any one of a first surface of the inner casing portion **11** facing the cartridge member **60** and a second surface of the cartridge member **60** facing the inner casing portion **11** and includes a main linear movement guide rail **82** provided at the other of the first surface and the second surface and with which the main linear moving body **81** is combined to be linearly movable.

As an example, the cartridge-supporting spring member **90** is included in the main linear movement guide rail **82** such that one end thereof is supported by the main linear moving body **81** and the other end is supported by the cartridge member **60**.

The cartridge-supporting spring member **90** is included in the main linear movement guide rail **82** to elastically support the cartridge member **60** and guide the cartridge member **60** to linearly reciprocate at the same time.

Also, the linear movement guide member **80** may further include a movement guide protrusion portion **83** protruding from any one of the first surface and the second surface and a movement guide slit groove portion **84** which is provided at any one of the first surface and the second surface, into which the movement guide protrusion portion **83** is inserted, which is disposed in a longitudinal direction of the body casing member **10**.

When the cartridge-colliding protrusion portion **33** collides with the cartridge protrusion portion **61** due to rotation of the spraying rotor **30**, the main linear moving body **81** moves along the main linear movement guide rail **82** and the movement guide protrusion portion **83** moves along the movement guide slit groove portion **84** such that the cartridge member **60** precisely performs linearly reciprocal movement.

The spraying rotor **30** is rotated by the rotating motor **40** and moves the powder material to the spray hole **21** between the spiral protrusion portion **32** so as to discharge the powder material through the spray hole **21** and simultaneously, repeatedly collides the cartridge-colliding protrusion portion **33** with the cartridge protrusion portion **61** so as to allow the cartridge member **60** to perform linearly reciprocal movement in an upward or downward direction, that is, in the longitudinal direction of the body housing portion opposite to the outlet **60a**.

As the spraying rotor **30** rotates, the cartridge member **60** reciprocally moves in a direction opposite the front end part, that is, the front end part where the outlet **60a** is provided such that the powder material therein is easily discharged through the outlet **60a** and is supplied to an inside of the spray nozzle member **20**.

Also, the powder material discharged from the cartridge member **60** and supplied to an inside of the spray nozzle member **20** is moved to the spray hole **21** by the spiral protrusion portion **32** and is easily sprayed through the spray hole **21**.

Meanwhile, the portable spray device according to the present invention may further include a spray hole opening or closing member **100** which opens or closes the spray hole **21**.

The spray hole opening or closing member **100** blocks the spray hole **21** when not in use and opens the spray hole **21** such that the powder material is sprayed through the spray hole **21** when the spraying rotor **30** is rotated, that is, in use.

As an example, the spray hole opening or closing member **100** opens the spray hole **21** using a pressurizing force caused by rotation of the spraying rotor **30** with a valve plate **110** formed of an elastic material and blocks the spray hole **21** using self-same elastic force thereof when the spraying rotor **30** is stopped.

Also, FIG. **4** is a perspective view illustrating a funnel member of the portable spray device according to the present invention. Referring to FIG. **4**, a funnel member **160** for filling the inside of the cartridge member **60** with the powder material is further included.

The funnel member **160** allows the cartridge member **60** to be refilled with the powder material through the material supply hole **60b** so as to drastically increase convenience in refilling the cartridge member **60** with the powder material.

FIGS. **5** and **6** are enlarged cross-sectional views illustrating the inside of the spray nozzle member **20** according to the present invention. Here, the spray hole opening or closing member **100** includes an electromagnet portion **120** provided at a front end part of the spraying rotor **30**, a spray hole stopper portion **130** which is moved by a magnetic force of the electromagnet portion **120** and opens or closes

the spray hole **21**, a stopper-supporting spring member **140** which elastically supports the spray hole stopper portion **130** to block the spray hole **21**, and a stopper movement guide portion **150** which guides movement of the spray hole stopper portion **130**.

As an example, the stopper movement guide portion **150** is integrally provided at the front end part of the spraying rotor **30** and is opened toward the front end such that the electromagnet portion **120**, the stopper-supporting spring member **140**, and the spray hole stopper portion **130** are inserted therein.

As an example, the spray hole stopper portion **130** is a magnetic body moved toward the electromagnet portion **120** when the electromagnet portion **120** generates a magnetic force. The stopper-supporting spring member **140** elastically supports the spray hole stopper portion **130** to block the spray hole **21** and allows the spray hole stopper portion **130** to block the spray hole **21** again when the magnetic force of the electromagnet portion **120** is removed.

The electromagnet portion **120** is connected to the operation control portion **50** and receives electrical power and generates a magnetic force when the electrical power is supplied to the rotating motor **40** through the switch portion **52** and the spraying rotor **30** is rotated.

That is, when a user pushes the switch portion **52** and rotates the rotating motor **40**, a magnetic force is generated in the electromagnet portion **120** such that the spray hole stopper portion **130** moves toward the electromagnet portion **120** and opens the spray hole **21**.

Also, due to the rotation of the spraying rotor **30**, the powder material which the spray nozzle member **20** is filled with is moved toward the front end part of the spray nozzle member **20**, that is, toward the spray hole **21**, by the spiral protrusion portion **32** and is easily sprayed through the spray hole **21**.

Also, when the user pushes the switch portion **52** again and stops the rotating motor **40**, power supply of the electromagnet portion **120** is blocked and the magnetic force is removed in the electromagnet portion **120** such that the spray hole stopper portion **130** blocks the spray hole **21** again due to an elastic force of the stopper-supporting spring member **140**.

FIG. **7** is a view illustrating a state of using the portable spray device according to the present invention and illustrating an example of embodying a latter art using the portable spray device according to the present invention.

According to the present invention, since it is possible to uniformly spray a powder material without a clog through rotation of a screw included in a nozzle, the material may be used without a problem caused by clogging of the material and convenience in use may be significantly increased.

According to the present invention, since it is possible to freely express and easily decorate letters, patterns, or the like, which are desired by a user, not only on food but also a drink such as coffee and the like by smoothly and uniformly spraying a powder material without a cog, expressiveness of the user may be maximized and expressiveness and aesthetic effects of decorating letters or patterns increase may be increased.

While the present disclosure has been particularly illustrated and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the present disclosure as defined by the following claims. The exemplary embodiments should be considered in a descriptive sense only and not for purposes of limitation.

## 11

The invention claimed is:

1. A portable spray device comprising:
  - a body casing member;
  - a spray nozzle member which is provided at a front end part of the body casing member and comprises a spray hole for spraying a powder material;
  - a cartridge member which is located in the body casing member and discharges a stored powder material through an outlet and supplies the stored powder material to an inside of the spray nozzle member; and
  - a spraying rotor which is disposed in the spray nozzle member and sprays the powder material through the spray hole through rotation thereof,
 wherein the spraying rotor collides with the cartridge member, which supplies the stored powder material to the spraying rotor, at least once during a single rotation and moves the cartridge member in a longitudinal direction.
2. The portable spray device of claim 1, wherein movement of the cartridge member comprises at least one of upward and downward movement, leftward and rightward movement, regular or irregular movement, and diagonal movement.
3. The portable spray device of claim 1, wherein the outlet is disposed at a front end part of the cartridge member.
4. The portable spray device of claim 1, wherein the spraying rotor comprises:
  - a rotational shaft portion which receives a rotating force and rotates; and
  - a spiral protrusion portion which spirally protrudes from an outer circumferential surface of the rotational shaft portion.
5. The portable spray device of claim 4, wherein the spraying rotor further comprises a cartridge-colliding protrusion portion which protrudes from the rotational shaft portion and collides with the cartridge member.
6. The portable spray device of claim 5, wherein a cartridge protrusion portion, which collides with the cartridge-colliding protrusion portion, protrudes from a front end part of the cartridge member.
7. The portable spray device of claim 4, wherein the rotational shaft portion has a conical shape having a diameter gradually decreasing toward a front end part, and wherein the spiral protrusion portion comprises a plurality of material moving groove portions spaced apart from each other.
8. The portable spray device of claim 7, wherein the spiral protrusion portion has a shape in which a plurality of spiral protrusions are spaced apart from each other and an interval is formed between the spiral protrusions.
9. The portable spray device of claim 1, further comprising a linear movement guide member which guides the movement of the cartridge member.
10. The portable spray device of claim 1, further comprising a cartridge-supporting spring member which elastically supports the cartridge member.
11. The portable spray device of claim 9, wherein the body casing member comprises a rotating motor rotating the spraying rotor, an inner casing portion in which an operation control portion controlling an operation of the rotating motor

## 12

is mounted, and an outer casing portion in which the inner casing portion is disposed, and

wherein the linear movement guide member comprises:
 

- a main linear moving body provided at any one of a first surface of the inner casing portion facing the cartridge member and a second surface of the cartridge member facing the inner casing portion; and
- a main linear movement guide rail provided at the other of the first surface and the second surface and with which the main linear moving body is combined to be linearly movable.

12. The portable spray device of claim 11, further comprising a cartridge-supporting spring member which elastically supports the cartridge member,

wherein the cartridge-supporting spring member is provided in the main linear movement guide rail and elastically supports the cartridge member.

13. The portable spray device of claim 11, wherein the linear movement guide member further comprises:

a movement guide protrusion portion which protrudes from any one of the first surface and the second surface, and

a movement guide slit groove portion which is provided at any one of the first surface and the second surface, into which the movement guide protrusion portion is inserted, and which is disposed in a longitudinal direction of the body casing member.

14. The portable spray device of claim 1, wherein the body casing member comprises a rotating motor rotating the spraying rotor, an inner casing portion in which an operation control portion controlling an operation of the rotating motor is mounted, and an outer casing portion in which the inner casing portion is disposed, and

wherein any one of the inner casing portion and the outer casing portion slides toward the other side and is combined therewith.

15. The portable spray device of claim 1, further comprising a funnel member capable of being utilized to fill the inside of the cartridge member with a powder material.

16. The portable spray device of claim 1, further comprising a spray hole opening or closing member which opens or closes the spray hole.

17. The portable spray device of claim 16, wherein the spray hole opening or closing member comprises:

an electromagnet portion provided at a front end part of the spraying rotor;

a spray hole stopper portion which is moved by a magnetic force of the electromagnet portion and opens or closes the spray hole;

a stopper-supporting spring member which elastically supports the spray hole stopper portion to block the spray hole; and

a stopper movement guide portion which guides movement of the spray hole stopper portion.

18. The portable spray device of claim 17, wherein the electromagnet portion receives electrical power when the rotating motor is operated and generates a magnetic force to open the spray hole, and electrical power supply is blocked when the rotating motor is stopped.